REMARKS:

Claims 1 and 3-11 are in the case and presented for consideration.

Claims 1 and 3-11 were rejected under 35 U.S.C. 103(a) as being obvious from U.S. Patent 6,275,363 to Gill in view of U.S. Patent 6,507,187 to Olivas et al.

Claim 1 has been rewritten only to correct grammar and antecedent basis. Thus, the claims have not been changed for patentability reasons. Also, because the substance of the claims has not changed, there are no new issues or new matter.

Applicants respectfully submit that the references cited in the rejection as making the identified claims obvious cannot properly be combined, and that the invention as claimed is in fact non-obvious from these references. Applicants respectfully traverse the rejections for the following reasons.

Initially applicants note that when combining references to find a claimed invention obvious, a suggestion or teaching must be found in the prior art to make the combination. It is well established in the patent law that, "obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination." Carela v. Starlight Archery, 804 F.2d 135, 231 USPQ 644 (Fed. Cir. 1986).

> When prior art references require a selective combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself. Something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination.

Uniroyal Inc. v. Rudkin-wiley Corp., 837 F.2d 1044, 5 USPQ2d 1434 (Fed. Cir. 1988).

Applicants respectfully submit that a prior art reference should not be taken out of context and relied upon with the benefit of hindsight to show obviousness. Rather, a

reference should be consid red as a whole, and portions arguing against, or teaching away the claimed invention must be considered. Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc., 230 USPQ 416 (Fed. Cir. 1986).

The examiner has indicated that "Gill falls to disclose that the copper spacer layer is contiguous on both sides with a CoFe layer of the free ferromagnetic layer, and on another side being contiguous with the CoFe layer of the antiferromagnetic layer system." According to the examiner, Olivas '187 is cited for disclosing deposition of layers of cobalt "to separate the mixing of permalloy and copper and the mixing of iron manganese and copper." The examiner continues that "provision of such layers would be motivated by the desired goal of eliminating diffusion of Ni components at layer interfaces and enhancing the MR ratio of the device."

Applicants respectfully disagree with the examiner's reasoning.

First, claim 1 recites at least one limitation which is not taught or suggested by either Gill '363 or Olivas '187. Hence, claim 1 cannot be obvious from the combination of the references regardless of the motivation for combination. Neither Gill '363, nor Olivas '187 teach or suggest the recited limitation, "a side of the Cu-type layer is contiguous with a CoFe layer of the free ferromagnetic layer, and another side of the Cu-type layer is contiguous with the CoFe layer of the AAF system."

Drawing the examiner's attention to Fig. 12 in Gill '363, which is the basis for the present rejection, the copper layer 304 is not contiguous to a layer of CoFe of either a free ferromagnetic layer or an AAF system. The copper layer 304 is not contiguous to a CoFe layer 236 of the pinned structure 206. Instead, the copper layer 304 is contiguous to a layer of Al_2O_3 which separates the pinned structure 206 from the copper layer 304. On the other side, the copper layer 304 is contiguous with NiFe. Gill '363

fails to teach or suggest a side of the copper layer being contiguous with a CoFe layer of the AAF layer system or a free layer, as recited in claim 1.

Olivas '187 does not teach or suggest a CoFe layer contiguous with a side of a copper layer either. Olivas '187 only teaches cobalt. CoFe gives a lower coercivity and better texture in the free layer than cobalt, as explained in the specification at page 3, lines 19-20. Thus, Olivas '187 also teaches away from the advantages of using CoFe. Furthermore, Olivas '187 does not even teach or suggest a cobalt layer of an AAF system or a free ferromagnetic layer, since all of the layers are separate. One skilled in the art seeking to combine CoFe layers contiguously with a Cu-type layer would not look to either Gill '363 or Olivas '187.

Second, there is no suggestion to combine Gill '363 with Olivas '187 because Gill '363 teaches a layer of NiFe in a free layer contiguous with one side of a copper layer and a layer of Al_2O_3 contiguous with the other side of the copper layer, whereas Olivas '187 teaches layers of cobalt, which are not part of either a free or AAF layer, but are contiguous to both sides of a copper layer. The teachings of the two references are very different from each other, and from the claimed invention.

Also, in view of the fact that the CoFe layer of the pinned structure 206 is separated from the copper layer 304 by the layer of Al_2O_3, there is no motivation to look to Olivas '187 for providing a layer of CoFe of an AAF system contiguous to the copper layer, as claimed. Likewise, the examiner's reasoning that the motivation for providing a layer of Co is to eliminate diffusion is not supported by the references because the CoFe layer of the pinned structure 206 is already separated from the Cu layer by the Al_2O_3 layer. Elimination of diffusion is thus not a proper motivation.

Moreover, the examiner's explanation of motivation to eliminate diffusion of Ni

components at layer interfaces is not supported by the cited references since Ni components are found on only one side of the copper layer in Gill '363.

The examiner's assertion of boosting the GMR ratio as another motivation for combining the references is also deemed irrelevant in light of the above arguments. It is well known that the GMR ratio sensitively depends on the interfacial roughness and the degree of interfacial chemical mixing between the low resistivity metal layer and the adjacent ferromagnetic metal layers. The GMR ratio is highest when the interfacial roughness and the intermixing are lowest. Thus, GMR ratio is related to the problem of diffusion between layers. Since Gill '363 teaches a pinned layer already separated from a copper layer by Al_2O_3, intermixing and interfacial roughness are already reduced, and thus, there would be no need to boost GMR. Furthermore, the device in Gill '363 has significantly more layers than the device in Olivas '187, and thus a boost in GMR ratio would not necessarily be predictable. Nor is there any evidence that one would find a desire to boost GMR ratio in the Gill '363 patent.

In the Response to Arguments section of the present Office Action, the examiner first argues that even though Gill '363 does not teach that the copper layer is contiguous to any of the CoFe layer of the pinned structure, provision of cobalt layers is motivated by the desire for eliminating diffusion and enhancing GMR ratio. First, Gill '363 does not state such a desire, suggesting prohibited hindsight in the examiner's arguments. Secondly, as stated above, Al_2O_3 already separates the copper layer and the pinned layer in Gill '363 and eliminating diffusion or enhancing GMR ratio is not proper motivation.

The examiner next addresses applicant's argument that none of the patents provide a teaching or suggestion that the Cu layer is contiguous with the CoFe layer of

an AAF layer. The examiner follows with a response regarding Olivas '187 in which he fails to describe a CoFe layer of an AAF layer. Thus, th examiner has failed to address applicant's argument. Nevertheless, applicants have shown above that none of the references teach or suggest a copper layer contiguous with the CoFe layer of an AAF layer.

Additionally, applicant notes that independent claim 1 fails to teach "a substrate which carries a free and a pinned ferromagnetic layer separated by a non-magnetic spacer layer therebetween," as recited in claim 1. In his rejection, the examiner does not even mention a substrate. Gill '363 fails to teach or suggest a substrate which carries the free later, pinned ferromagnetic layer, and non-magnetic spacer layer.

Furthermore, claim 5 recites that "the exchange biasing layer is arranged between the substrate and the AAF layer system." Since, Gill '363 fails to teach or suggest a substrate, Gill '363 also fails to teach or suggest an exchange biasing layer arranged between the substrate and the AAF layer system, as recited in claim 5.

In conclusion, it is respectfully believed that the examiner's rejection is based on prohibited hindsight. Not only are both references missing certain limitations recited in claim 1, but there is not even a suggestion to combine the references. The examiner has cited elimination of diffusion at the interfaces between the layers as the motivation for combining the references, but as applicants have shown, the pinned structure in the Gill '363 reference is already separated from the copper layer by Al_2O_3, and thus the motivation for providing a cobalt layer between an AAF system and a copper layer is non-existent. Neither prevention of diffusion, nor the related boosting of GMR ratio is proper motivation as explained above.

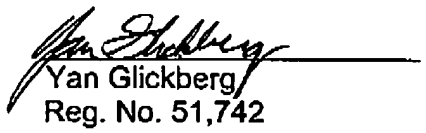
Accordingly, the application and claims are believed to be in condition for

allowance, and favorable action is respectfully requested. No new matter has been added.

If any issues remain which may be resolved by telephonic communication, the Examiner is respectfully invited to contact the undersigned at the number below, if such will advance the application to allowance.

Favorable action is respectfully requested.

Respectfully submitted,



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